



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Compliance with COVID-19 safety measures: A test of an objectification theory model

Megan Earle^{a,*}, Elvira Prusaczyk^{a,1}, Becky Choma^b, Rachel Calogero^c

^a Department of Psychology, Brock University, 1812 Sir Isaac Brock Way, St. Catharines, ON, L2S 3A1, Canada

^b Department of Psychology, Ryerson University, 350 Victoria Street, Toronto, ON, M5B 2K3, Canada

^c Department of Psychology, Western University, 1151 Richmond Street, London, ON, N6K 5C2 Canada



ARTICLE INFO

Article history:

Received 1 June 2020

Received in revised form 6 January 2021

Accepted 17 January 2021

Available online 22 January 2021

Keywords:

Objectification theory

Sexual objectification

Self-objectification

Safety anxiety

COVID-19 safety measures

ABSTRACT

In the present paper, we tested an objectification theory model including compliance with COVID-19 safety measures as an outcome. Safety measures recommended by governments and health organizations include monitoring one's body and interpersonal and social distance from others. We contend that the diffuse safety anxiety stemming from sexual and self-objectification encourages targets to broadly adopt behaviors that protect against body-based dangers, including COVID-19. Accordingly, safety anxiety should predict greater compliance with COVID-19 safety measures. U.S. residents ($N = 501$) were recruited online and completed measures of sexual objectification, self-objectification, safety anxiety, appearance anxiety, and COVID-19 safety compliance. Two-step mediation analyses revealed a positive indirect effect of sexual objectification on safety anxiety through internalization of observers' perspectives (self-objectification Factor 1); in turn, there was a positive indirect effect of internalized others on COVID-19 body-based safety compliance through safety anxiety. Moreover, women (vs. men) reported higher levels of sexual objectification, internalization of observers' perspectives, safety anxiety, appearance anxiety, and COVID-19 safety measure compliance. Not only is safety anxiety relevant to cautionary behaviors protective against sexual objectification threat, but it also predicts compliance with measures that reduce the risk of contracting COVID-19. Implications for objectification theory are discussed.

© 2021 Elsevier Ltd. All rights reserved.

1. Introduction

Sexual objectification, or the treatment and portrayal of women as sexual objects, is a common experience for women. In the U.S., a sexual assault occurs every 73 s, with 9 out of 10 victims being women (Statistics, n.d.). Moreover, mass media frequently bombards consumers with sexually objectifying images of women (e.g., Bartky, 1990; Kilbourne, 2002; Stankiewicz & Rosselli, 2008; Wolf, 1991). Other common sexually objectifying experiences include catcalling, unwanted sexual attention, or offensive sexual jokes (Roberts et al., 2018). Of relevance, objectification theory (Fredrickson & Roberts, 1997) is a framework for understanding the effects of living in a culture that chronically sexually objectifies women and, to a lesser extent, men (see Smith et al., 2018).

According to objectification theory, sexual objectification socializes targets to adopt a view of themselves as sexual objects, that is, to self-objectify. Specifically, self-objectification involves both internalizing an outsiders' view of one's body (i.e., the *internalized other* dimension of self-objectification) and regarding one's bodily appearance as representative of the self (i.e., the *self as body* dimension; see Lindner & Tantleff-Dunn, 2017). In other words, those who self-objectify view themselves through the eyes of the objectifier(s) and regard their appearance as central to their overall worth.

Studies show that the self-objectification induced by sexual objectification, in turn, predicts negative consequences including appearance anxiety and safety anxiety (see Calogero et al., 2019; Calogero et al., 2020) (for reviews see Calogero, 2012; Calogero et al., 2011). Specifically, appearance anxiety involves the anticipation of one's physical appearance being the target of evaluation by others, whereas safety anxiety includes anticipating and worrying about external threats to one's safety. Appearance and safety anxiety subsequently lead to physical and mental restraints such as restricted freedom of movement, disordered eating, depression, and sexual dysfunction (see Calogero, 2012; Calogero et al., 2020). Although research on safety anxiety is limited, recent

* Corresponding author.

E-mail addresses: me11tt@brocku.ca (M. Earle), ep15je@brocku.ca (E. Prusaczyk), becky.choma@psych.ryerson.ca (B. Choma), rcalogero@uwo.ca (R. Calogero).

¹ Indicates shared first authorship. Order between the first two authors was determined by a coin flip.

work demonstrates that, among women, safety anxiety explains the links from both sexual and self-objectification to restricted freedom of movement in public spaces, independent of appearance anxiety and other negative subjective experiences (Calogero et al., 2020). Moreover, another study demonstrated that among women, stranger harassment (i.e., sexual objectification) predicted self-objectification, which in turn predicted restricted freedom of movement through increased fear of rape (Fairchild & Rudman, 2008). In the present context, we contend that safety anxiety, an aspect of objectification theory that has received relatively little empirical attention, can extend applications of objectification theory to compliance with COVID-19 safety precautions. To make our case, we define COVID-19 and describe and distinguish between body-based and interpersonal-based COVID-19 safety precautions, followed by a detailed overview and rationale of our extended objectification theory model.

In December 2019, a novel coronavirus (2019-nCoV)-infected pneumonia was identified and named Severe Acute Respiratory Syndrome Coronavirus 2 (i.e., SARS-CoV-2 or COVID-19) (see Zhu et al., 2020). According to Li et al. (2020), initial cases of COVID-19 originated in Wuhan, Hubei Province, China from the Huanan Seafood Wholesome Market, with cases after January 1, 2020 based on human-to-human transmission among close contacts. By the end of February 2020, COVID-19 rapidly spread worldwide (WHO, 2020a) and on March 11, 2020, the World Health Organization officially declared COVID-19 a pandemic (WHO, 2020b). Within the following months, millions of COVID-19 cases were confirmed worldwide, including over one million associated deaths (WHO, 2020c). Common symptoms of COVID-19 include fever, cough, and fatigue (Guan et al., 2020; WHO, 2020d); less frequently experienced symptoms are loss of taste or smell, nasal congestion, sore throat, headache, and muscle or joint pain (WHO, 2020d). In severe cases, infected individuals also experience shortness of breath, loss of appetite, confusion, and persistent pain or pressure in the chest (WHO, 2020d). With its rapid transmission and acute symptoms, COVID-19 became a critical public health emergency.

To slow the spread of COVID-19, the Centers for Disease Control (CDC, 2020), Red Cross (2020), and WHO (2020e) advised that people strictly adhere to various safety measures. Some safety measures involve monitoring one's body-based behaviors, such as engaging in prolonged handwashing, wearing a mask, and limiting hand-to-face contact. Other safety precautions include monitoring interpersonal distancing, such as physically avoiding others (i.e., keeping 6 feet apart), avoiding public transportation, and shopping during non-peak hours. Such safety measures are essential to slow the spread of COVID-19 (as well as other viruses under normal circumstances). Nevertheless, and despite widespread dissemination of safety guidelines, some research suggests that people adhere to COVID-19 safety measures to varying degrees. For instance, rather than uniform compliance, some people are less likely to comply with safety measures, including young adults with lower (vs. higher) self-control (Nivette et al., 2020; van Rooij et al., 2020) or shame/guilt (Nivette et al., 2020), people who believe that COVID-19 health measures are ineffective (Clark et al., 2020), and those who fear authority (van Rooij et al., 2020).

Moreover, and of relevance, Ngonghala et al. (2020) analyzed cumulative mortality data from Arizona, Florida, New York, and the entire U.S. and suggested that the use of face masks in conjunction with more prolonged lockdown procedures could have halted the resurgence of COVID-19 post-lockdown, but only if most people complied. Importantly, and consistent with Ngonghala et al. (2020), research suggests that U.S. residents are less likely to comply with COVID-19 safety measures when they have more opportunities to break the rules (see Rooij et al., 2020). Of note, the present data were collected from U.S. participants at the pandemic's onset when safety measures were recommended but not strictly or uniformly

enforced across state bodies (see Haffajee & Mello, 2020). Thus, people had more opportunities to avoid compliance, with some undoubtedly more likely to comply with measures than others. Accordingly, in the present research, we investigate other predictors of voluntary safety measure compliance in the context of objectification theory.

As previously outlined, appearance and safety anxieties involve hypervigilance against external threats (see Fairchild & Rudman, 2008), with safety anxiety particularly relevant for restricting voluntary movement (Calogero et al., 2020). As a precautionary behavior, restricted movement in public spaces reduces one's risk for being the target of sexual assault and harm, at the cost of reduced freedom of mobility. An implication of the chronic state of hypervigilance toward one's safety might include engaging in any body-based behavior that can protect oneself from impending danger. Of relevance, in testing the psychometric properties of the Personal Safety Anxiety and Vigilance Scale (PSAVS), Calogero and colleagues (2020) showed that safety anxiety is a unidimensional construct involving diffuse and nonspecific feelings of threat. Some items concern overall vigilance in public spaces whereas others measure lingering concern when alone based on past threats. Given the diffuse and nonspecific nature of safety anxiety, we contend that safety anxiety can broadly predict any behavior that guards against a threat to one's body.

Accordingly, to avoid contracting COVID-19, a serious threat in the present global context, those socialized to be generally vigilant and anxious about maintaining their safety should also be more likely to adhere to COVID-19 safety measures. Important to consider is that although protective, adherence to COVID-19 safety guidelines places restrictions on one's regular way of life; thus, unless one tends to be vigilant and concerned about their safety, complying with safety precautions might occur less frequently. We also reasoned that because appearance anxiety is often tied to vigilance about others noticing and judging one's appearance, it is possible that appearance anxiety also carries over to predict behaviors relevant to protecting one's self from COVID-19. Past research has also demonstrated a small positive association between personal safety anxiety and appearance anxiety (Calogero et al., 2020). In these ways, both safety anxiety and appearance anxiety serve a similar function in the context of objectification theory: to protect oneself from external threat. Consistent with this theorizing, we expect greater self-objectification stemming from sexual objectification experiences to predict greater safety anxiety and appearance anxiety, and in turn, greater adherence to COVID-19 safety measures.

As a secondary goal, we also examined gender differences in the model's variables. The consequences of sexual objectification, as outlined by objectification theory, are similar among men and women to the extent that they experience sexual objectification (e.g., Calogero et al., 2020—Study 4; Choma et al., 2010; McKinley, 2006; Oehlhof et al., 2009). However, women (vs. men) are more likely to be targets of sexual objectification (e.g., Aubrey & Frisby, 2011; Smith et al., 2018), suggesting that women should also be more likely than men to report self-objectification, appearance and safety anxiety, and compliance with COVID-19 safety precautions (e.g., see also Greenfieldboyce, 2020 and Jones, 2020 for suggestions that women might be more likely to comply to these safety precautions than men). Although past work has documented gender differences in some variables relevant to objectification (e.g., self-objectification; see Choma et al., 2010; Harsey & Zurbriggen, 2020; Hebl et al., 2004; Huebner & Fredrickson, 1999; Roberts and Gettman, 2004; Slater and Tiggemann, 2011), documenting these gender differences in the current study is both useful and essential, especially for safety anxiety, given the relatively little research on this aspect of objectification theory, and with a fairly new measure of self-objectification (i.e., Lindner and Tantleff-Dunn's (2017) Self-

Objectification Beliefs and Behaviors Scale; SOBBS) that addresses the limitations of previously used self-objectification measures.

2. Method

2.1. Participants and procedure

Data were collected from 501 U.S. participants in April 2020 via Amazon Mechanical Turk and Cloud Research. Cloud Research is a platform that allows researchers to collect higher quality data from Amazon Mechanical Turk with features that help ward off threat from form-completion bots (e.g., by blocking suspicious geocode locations and duplicate IP addresses). At the time of data collection, approximately one third of all COVID-19 cases were in the U.S. (WHO, 2020f). Participants completed measures of sexual objectification experiences, self-objectification, safety anxiety, appearance anxiety, and compliance with COVID-19 precautions (see OSF for pre-registration and measures; https://osf.io/zw7un/?view_only=5897a0fb14f9404db497456af9904999). Participants who failed an attention check ($n = 6$), indicated that they did not take the survey seriously ($n = 2$), or did not identify as male or female ($n = 4$) were excluded from analyses. The final sample included 489 participants ($M_{age} = 40.57$, $SD = 14.58$, 51.1 % female, 48.9 % male), 75.5 % of whom identified as White, 8.8 % as Black, 14 % as Asian, 4.3 % as Latin American, and 0.4 % as another race/ethnicity. An a priori power analysis conducted using pwrSEM (Wang & Rhemtulla, in press) suggested that 460 participants would adequately power the hypothesized mediation model.

2.2. Materials

2.2.1. Sexual objectification experiences

Participants completed the 9-item Stranger Harassment Index (Fairchild & Rudman, 2008). Participants first indicated whether they had an objectifying experience (e.g., “unwanted sexual attention”; yes = 1, no = 0) and then how frequently (1 = *once*; 5 = *every day*). Scores on the dichotomous items were multiplied by the frequency of occurrence. Higher scores indicated more objectifying experiences (overall $\alpha = .89$; male $\alpha = .87$; female $\alpha = .89$).

2.2.2. Self-Objectification

Participants completed the 14-item SOBBS (Lindner & Tantleff-Dunn, 2017), which assesses both *internalized other* (e.g., “I often think about how my body must look to others”, overall $\alpha = .91$; male $\alpha = .91$; female $\alpha = .92$) and *self as body* (e.g., “Looking attractive to others is more important to me than being happy with who I am inside”, overall $\alpha = .91$; female $\alpha = .93$; male $\alpha = .88$) dimensions of self-objectification. Responses were provided on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*) with higher scores reflecting greater *internalized other* and *self as body* dimensions of self-objectification levels, respectively.

2.2.3. Safety anxiety

Participants responded to the 8-item PSAVS which includes items such as “I check behind me when I am walking alone to see if someone is there,” and “When alone, past experiences where I have felt physically threatened enter my mind” (Calogero et al., 2020). Responses were provided on a 7-point Likert scale (1 = *completely unlike me*, 7 = *completely like me*) with higher scores indicating greater safety anxiety (overall $\alpha = .87$; female $\alpha = .85$; male $\alpha = .80$).

2.2.4. Appearance anxiety

Participants responded to the 16-item Social Appearance Anxiety Scale (Hart et al., 2008) using a 5-point Likert scale (e.g., “I am afraid that people find me unattractive,” 1 = *not at all*; 5 =

extremely). Higher scores indicated greater appearance anxiety (overall $\alpha = .96$; female $\alpha = .96$; male $\alpha = .96$).

2.2.5. Compliance with COVID-19 precautions

Participants responded to five items indicating their compliance with COVID-19 precautions regarding *monitoring one's body-based behaviors* (e.g., limited hand-to-face contact, avoided touching potentially infected objects (e.g., door handles, elevator buttons), covered coughs and sneezes (e.g., with disposable tissues or elbow); overall $\alpha = .71$; female $\alpha = .60$; male $\alpha = .78$). An additional 11 items concerned compliance with COVID-19 precautions relevant to *monitoring interpersonal distance* (e.g., physical/social distancing, had essentials (e.g., food) delivered to your home, stayed home if you felt unwell; $\alpha = .84$; female $\alpha = .80$; male $\alpha = .86$). Items were from Choma et al. (2021) with some minor differences. For instance, Choma and colleagues did not include “purchased or worn a mask” given that at the time of their data collection masks were not being recommended by authorities. We also changed “disinfected obje...” to “avoided touching potentially infected objects...”. Moreover, we included “practiced physical/social distanc...” whereas Choma and colleagues included an item about interpersonal distancing under their measure of future compliance behaviour. Like Choma et al., we included “avoided physical contact with others, except those in your household...” but also added “. . .including those in your household.” Last, unlike Choma and colleagues, we did not include the item “kept kids home from school.” Participants responded on a scale from 1 (*not at all*) to 7 (*all or almost all of the time*) indicating the extent to which they engaged in the behaviours over the past week. Higher scores indicated greater compliance with COVID-19 precautions. Confirmatory factor analyses suggested that a 2-factor model, where own-body precautions and interpersonal precautions were specified as two correlated factors, provided better fit to the data compared to a single factor solution ($\Delta \chi^2 = 123.37$, $p < .001$). As such, we treat precautions relevant to one's own body and precautions relevant to interpersonal relations as separate outcomes.²

2.2.6. Attention checks

Participants responded to an attention check item that read “This item is checking for reading comprehension. Please select ‘not at all’ as your response to this item” and was embedded in the appearance anxiety measure (see Prusaczyk et al. (2020) for use of a similar item). At the end of the study, participants also indicated whether they recommend that we use their data (“Yes, definitely use my answers. I took this task seriously”, or “No, please do not use my answers. I did not take this task seriously”). Participants who answered incorrectly to the attention check item or indicated that they did not take the task seriously were excluded from data analysis.

3. Results

For descriptive statistics and bivariate correlations, see Supplemental Table 1. Outliers (defined as scores greater than three standard deviations from the mean) were winsorized (converted to scores at three standard deviations from the mean). Standard assumptions of linearity, normality, homogeneity of error variance, and independence of errors apply to mediation modeling and were met for the current model. A fully saturated ($df = 0$) two-step mediation model was specified using maximum likelihood estimation in Mplus v.8.3 (Muthén & Muthén, 2017). Specifically, own-body compliance and interpersonal compliance were set as

² Participants also reported perceived ease in compliance with COVID-19 precautions. Additional models were tested using compliance ease as an alternative outcome. For results, see Supplemental Figures 1 and 2 and Supplemental Table 2.

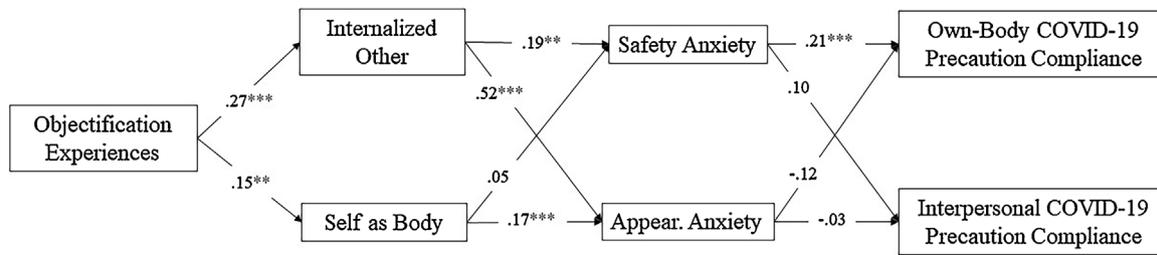


Fig. 1. Two-step mediation model predicting compliance with COVID-19 precautions. Direct effects, residual correlations between self-objectification factors, residual correlations between anxiety variables, and residual correlations between COVID-19 precaution measures were included but are not shown here. Standardized coefficients shown. Internalized other = self-objectification dimension 1. Self as body = self-objectification dimension 2. Appear. = appearance. ** $p < .01$, *** $p < .001$. $N = 487$.

Table 1
Total, indirect, and direct effects predicting compliance with COVID-19 precautions.

	β	SE	p	95 % CI	
				lower	upper
Objectification Experiences → Safety Anxiety					
Total Effect	0.42	0.04	<.001	0.36	0.48
Direct Effect	0.36	0.04	<.001	0.30	0.43
Indirect Effect: Internalized Other	0.05	0.02	.003	0.03	0.08
Indirect Effect: Self as Body	0.01	0.01	.315	0.00	0.02
Objectification Experiences → Appear. Anxiety					
Total Effect	0.22	0.05	<.001	0.14	0.29
Direct Effect	0.05	0.04	.137	-0.01	0.11
Indirect Effect: Internalized Other	0.14	0.02	<.001	0.10	0.18
Indirect Effect: Self as Body	0.03	0.01	.049	0.01	0.05
Internalized Other → Own-Body Compliance					
Total Effect	0.06	0.06	.340	-0.05	0.16
Direct Effect	0.08	0.07	.239	-0.03	0.19
Indirect Effect: Safety Anxiety	0.04	0.02	.006	0.02	0.07
Indirect Effect: Appearance Anxiety	-0.06	0.03	.053	-0.12	-0.01
Internalized Other → Interpersonal Compliance					
Total Effect	0.07	0.05	.187	-0.02	0.16
Direct Effect	0.07	0.06	.278	-0.04	0.17
Indirect Effect: Safety Anxiety	0.02	0.01	.114	0.00	0.05
Indirect Effect: Appearance Anxiety	-0.02	0.03	.644	-0.07	0.04
Self as Body → Own-Body Compliance					
Total Effect	-0.15	0.06	.009	-0.24	-0.05
Direct Effect	-0.14	0.06	.016	-0.24	-0.04
Indirect Effect: Safety Anxiety	0.01	0.01	.308	0.00	0.03
Indirect Effect: Appearance Anxiety	-0.02	0.01	.105	-0.05	0.00
Self as Body → Interpersonal Compliance					
Total Effect	-0.16	0.06	.005	-0.26	-0.06
Direct Effect	-0.16	0.06	.006	-0.26	-0.06
Indirect Effect: Safety Anxiety	0.01	0.01	.402	0.00	0.02
Indirect Effect: Appearance Anxiety	-0.01	0.01	.659	-0.02	0.01

Note. Appear. = appearance. Internalized other refers to the first dimension of self-objectification. Self as body refers to the second dimension of self-objectification. Compliance refers to compliance with COVID-19 safety precautions. $N = 487$.

criteria of safety anxiety, appearance anxiety, internalized other, self as body, and sexual objectification experiences. Safety anxiety and appearance anxiety were set as criteria of internalized other, self as body, and sexual objectification experiences. Self as body and internalized other were set as criteria of sexual objectification experiences. Residuals could covary. Parameter estimates and significance tests were based on bias-corrected estimates from 10,000 bootstrap samples. In the context of our hypotheses, mediation would be supported if sexual objectification experiences predict self-objectification (either self as body or internalized other) and self-objectification in turn predicts anxiety (safety or appearance), resulting in a significant indirect effect. Mediational hypotheses would also be supported if self-objectification predicts anxiety measures and anxiety in turn predicts COVID-19 compliance measures, resulting in significant indirect effects.

Fig. 1 shows standardized path coefficients. Table 1 shows direct effects (c'-paths), total effects (c-paths), and indirect effects. As expected, objectifying experiences was associated with greater

self-objectification (both internalized other and self as body). Also as predicted, internalized other was associated with more safety and appearance anxiety, and safety anxiety in turn was associated with greater own-body precaution compliance, but not interpersonal precaution compliance. Although self as body was associated with greater appearance anxiety, as expected, it was not significantly associated with safety anxiety or compliance measures.

As expected, there were significant indirect effects of sexual objectification experiences on appearance anxiety via the internalized other and self as body dimensions of self-objectification, and of sexual objectification experiences on safety anxiety via the internalized other dimension. Importantly, there was a significant indirect effect of internalized other on compliance with COVID-19 precautions relevant to one's own body via safety anxiety, such that greater internalization of observers' perspectives was associated with greater safety anxiety, which in turn was associated with greater compliance with own-body COVID-19 precaution compliance. No other indirect effects reached statistical significance.

3.1. Gender differences

A MANOVA revealed that gender was significantly associated with the combined dependent variables, $F(7, 477) = 36.53, p < .001, \eta_p^2 = .35$. Consistent with expectations, women (vs. men) reported more sexual objectification experiences, $F(1, 483) = 64.45, p < .001, \eta^2 = .12$, higher levels of the *internalized other* dimension of self-objectification, $F(1, 483) = 11.75, p = .001, \eta^2 = .02$, greater safety anxiety, $F(1, 483) = 170.32, p < .001, \eta^2 = .26$, greater appearance anxiety, $F(1, 483) = 7.00, p = .008, \eta^2 = .01$, and greater compliance with own-body COVID-19 precautions, $F(1, 483) = 9.52, p = .002, \eta^2 = .02$. Unexpectedly, men (vs. women) reported higher scores of the *self as body* dimension of self-objectification, $F(1, 483) = 4.01, p = .046, \eta^2 = .01$, and men and women did not differ in compliance with interpersonal COVID-19 precautions, $F(1, 483) = 3.35, p = .068, \eta^2 = .01$.

For exploratory purposes, and distinct from a test of mean differences in variables, we also assessed whether the strength and direction of the paths in the mediation models differed between men and women by using a multiple groups analysis. Findings are consistent with past work, suggesting that, to the extent that sexual objectification occurs, self-objectification processes are similar for both men and women (e.g., Calogero et al., 2020—Study 4; Choma et al., 2010; McKinley, 2006; Oehlhof et al., 2009). That is, mediation model results were similar for men and women in the current study. However, there were some notable exceptions regarding path strength. Specifically, for men (vs. women), sexual objectification experiences were more strongly associated with the *self as body* facet of self-objectification (although there was no difference for the *internalized other* facet), and *self as body* was more strongly associated with appearance and safety anxiety. For women (vs. men), *internalized other* was more strongly associated with safety and appearance anxiety, and safety anxiety was more strongly associated with own-body COVID-19 compliance. Full model results for this analysis are shown in Supplemental Figure 3.

4. Discussion

Consistent with our proposed extension of objectification theory (Fredrickson & Roberts, 1997), complying with COVID-19 safety recommendations relating to one's body occurred more frequently for those who were conditioned by sexual objectification to monitor their bodies and be vigilant about their physical safety. Specifically, the data supported a two-step mediation process whereby sexually objectifying experiences were linked to greater self-objectification (both internalized other and self as body dimensions), and internalized other, in turn, was linked to greater safety and appearance anxiety; safety anxiety, in turn, was linked to greater compliance with COVID-19 measures involving one's body. In other words, more frequent stranger harassment predicted hypervigilance about one's safety through internalizing the objectifier's perspective; internalizing the objectifier's perspective then predicted compliance with body-related COVID-19 safety precautions via increased safety anxiety.

In contrast to the *internalized other* dimension of self-objectification, the *self as body* dimension was only associated with appearance (but not safety) anxiety. Although we expected each self-objectification factor to be related to both safety and appearance anxiety, we suspect that the *internalized other* dimension was more relevant given that it directly concerns items related to body surveillance [e.g., "I try to imagine what my body looks like to others (i.e., like I am looking at myself from the outside)"] and the anticipation of external threats and evaluation (e.g., "I try to anticipate others' reactions to my physical appearance"). In contrast, the *self as body* dimension more directly concerns items related to the valuing of one's appearance over other attributes as cen-

tral to one's worth (e.g., "My body is what gives me value to other people"; "My physical appearance says more about who I am than my intellect"). Thus, surveying one's body in anticipation of others' reactions and threats could be especially crucial for being anxious about one's physical safety and physical appearance (one's physical appearance can cue unwanted sexual attention). Importantly, given previous issues with operationalizing self-objectification (e.g., see Calogero, 2011; Moradi et al., 2005), these findings highlight two distinct components of self-objectification and further validate the SOBBS.

Moreover, it might be the case that safety (vs. appearance) anxiety is more relevant to COVID-19 body-based compliance, given that it directly regards preoccupation with threat and safety in one's day-to-day environment. That is, safety anxiety more specifically operates to ward off potential danger to one's body. In contrast, appearance anxiety is more specific to worry about one's appearance and attractiveness being scrutinized. Therefore, it might not extend outside of these concerns to chronic worry about whether people notice if one is engaging in COVID-19 safety precautions (e.g., wearing a mask, washing one's hands). For this reason, it was likely not predictive of COVID-19 safety compliance.

Overall, findings from the present study demonstrate that objectification theory is a useful framework for understanding compliance with COVID-19 safety measures relating to one's body-based precautions. Our findings suggest that safety anxiety in the face of sexual objectification experiences encourages people to broadly adopt behaviors that protect their bodies against threat, in this case, COVID-19. Although safety anxiety in the context of sexual objectification is commonly considered to be a learned strategy to help ward off sexual violence, our results suggest that safety anxiety might have implications for self-preservation that are broader than initially considered. Safety anxiety, as a general and diffuse concern that helps generally protect against potential dangers, likely also helps ward off other risks to bodily harm, such as infectious diseases or hazards (e.g., one would be more compliant with occupational safety measures). To confirm this reasoning, future research could test extended objectification theory models wherein safety anxiety predicts other body-based precautionary behaviors.

Regarding the second goal of the present research, women reported experiencing more sexual objectification than men. This is consistent with past research showing that women tend to be sexualized more often in media than men (e.g., Aubrey & Frisby, 2011), and are more likely to report experiences of sexual abuse and harassment (e.g., see Smith et al., 2018). Also consistent with past research, women (vs. men) reported higher levels of the *internalized other* dimension of self-objectification, akin to findings showing that women (vs. men) are more likely to report body surveillance (e.g., see Choma et al., 2010). However, contrary to expectations, men (vs. women) reported higher levels of the *self as body* dimension.³ These gender differences suggest that men's and women's experiences of self-objectification might differ qualitatively. Men (vs. women) might be particularly concerned with their appearance as representative of their worth given that, as part of the masculine gender role, men are socialized to display dominance and masculinity (Vandello & Bosson, 2013) and strength (Calogero, 2009). That is, their sexual objectification experiences, that directly predict self-objectification, frequently involve the sexualization of muscular, sporty, and lean men in popular media (Gill, 2009). In contrast, women occupy a relatively disadvantaged social position and are more likely to be victimized (e.g., sexually assaulted)

³ Although unexpected, a recent study (Prusaczyk & Hodson, 2020) also revealed a similar gender difference on the SOBBS such that men ($M = 2.09, SD = .99$) scored significantly higher than women ($M = 1.92, SD = .96$) on *self as body*, $M_{diff} = -.17$ (95% CI: $-.33, -.02$); $t(652) = -2.27, p = .024$.

than men. Given that women's sexual objectification experiences are more likely than men's to include sexual victimization, they likely therefore exhibit more internalization of an objectifier's perspective. Concerning other gender differences in the objectification theory model's variables, women (vs. men) reported higher mean levels of safety and appearance anxiety, consistent with other research on safety anxiety (Calogero et al., 2020) and appearance anxiety (Choma et al., 2010).

Moreover, in an exploratory investigation of path differences in the mediation model results by gender, we found that for women (vs. men), the *internalized other* facet was more strongly associated with safety and appearance anxiety, whereas for men (vs. women), *self as body* was more strongly associated with these anxieties. Although speculative, it is possible that because women's (vs. men's) self-objectification experiences are more likely to concern the internalized other facet, and men's (vs. women's) are more likely to concern the self-as body facet, they then might each be more relevant in predicting the subjective experiences of safety and appearance anxiety outlined by objectification theory. However, results from past work on men's body-related experiences have been inconsistent on the relevance of objectification theory (Daniel & Bridges, 2010; Roberts et al., 2018). Thus, future work is needed on this topic to more fully understand how the processes surrounding self-objectification operate for men.

Last, and importantly, women (vs. men) reported greater compliance with COVID-19 precautions involving monitoring one's body, consistent with findings from U.S. polls (Jones, 2020). Griffith et al. (2020) proposed that men (vs. women) might be less likely to comply with COVID-19 safety precautions (e.g., washing hands, physical distancing, wearing masks) because they are socialized to hide their fears as displays of "manliness." Moreover, some men have also shown aggression and anger in response to COVID-19 threats, responses that are associated with downplaying the risk of COVID-19 and resisting risk-reducing policies (see Griffith et al., 2020). Further, men (vs. women) are more cavalier about COVID-19, with 25 % of men strongly agreeing that people are "unnecessarily panicking" about the virus, compared to 18 % of women (Kahn, 2020). However, another possibility concerns men and women's differing levels of safety anxiety. Given that we presently demonstrate that safety anxiety predicts increased COVID-19 safety compliance, and women score higher than men in safety anxiety, men's decreased adherence to safety precautions could be due to worrying less about external threats to their safety, and therefore complying to safety measures less frequently.

The main limitation of the present study is its correlational design, which cannot reveal the direction and causality of relations. Although paths are consistent with objectification theory, and previous research demonstrated the causality of most relations (e.g., Calogero and Tylka, 2014), future research could test the present model experimentally and longitudinally. Moreover, in the current study, we focused on participants' reported compliance with COVID-19 precautions, which might or might not reflect their actual behavior. Future work examining consequences of safety anxiety could assess actual behavior. There might also be cultural or regional differences that could affect relations between objectification-relevant variables and behaviors performed for the purpose of self-preservation (e.g., behavioral strategies to avoid infectious disease). For instance, countries vary in both COVID-19 prevalence and government recommendations for reducing risk of infection. Moreover, there is considerable cross-cultural variability in gender equality. Thus, the gender differences observed in the present study might vary by the level of gender equality in one's country. For instance, it is possible that gender differences narrow as gender equality increases. As such, future work should consider how processes of objectification, safety anxiety, and self-

preservation behaviors interact with the cultural context in which individuals are placed.

Critically, we are not promoting or encouraging self-objectification and safety anxiety as strategies for increasing body-based COVID-19 safety precaution. Indeed, theorists argue that safety anxiety can serve a protective function against sexual violence, but few would propose that safety anxiety is inherently good or should be central for protecting people against gender-based harassment and assault. Although objectification-provoked vigilance and preparedness to ward off threat could be beneficial in relatively short-term dangerous situations, such chronic anxiety and safety vigilance might be particularly detrimental if frequently experienced, particularly among women (vs. men) who report higher levels. Self-objectification and safety anxiety are chronic and maladaptive states that predict poor mental health outcomes (e.g., sexual dysfunction, depression, etc.) and restrict freedom of movement. Moreover, chronic stress and worry, undoubtable components of safety anxiety, are shown to increase inflammation and disease risk (Cohen et al., 2012). Therefore, a more appropriate and adaptive strategy for increasing compliance with COVID-19 safety precautions could be for public health officials to foster and maintain residents' *disease-specific vigilance* about contracting COVID-19 rather than promote, or rely on, processes of sexual objectification that increase chronic and nonspecific safety anxiety.

4.1. Conclusion

Being socialized by sexual objectification to monitor one's body promotes vigilance about one's safety. The present research further extends the reach of objectification theory for understanding and explaining the particular ways that sexual objectification shapes and directs women's and, to a lesser extent, men's lives. Specifically, the routine hypervigilance accompanying safety anxiety appears to broadly prepare people against many body-based threats, including COVID-19, by predicting higher compliance with COVID-19 safety measures. Safety anxiety, mainly theorized to occur in response to the anticipation of sexual assault, appears to have more diffuse applications. These findings lay the foundation for extending objectification theory or its applications in future work, particularly in the study of safety anxiety, an area of research in need of greater empirical attention.

CRedit authorship contribution statement

Megan Earle: Conceptualization, Investigation, Methodology, Writing - original draft. **Elvira Prusaczyk:** Conceptualization, Investigation, Methodology, Writing - original draft. **Becky Choma:** Conceptualization, Investigation, Methodology, Writing - review & editing. **Rachel Calogero:** Conceptualization, Investigation, Methodology, Writing - review & editing.

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.bodyim.2021.01.004>.

Declaration of Competing Interest

None. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

References

American Red Cross. (2020, May). *COVID-19: Safety tips for you* Retrieved from <https://www.redcross.org/about-us/news-and-events/news/2020/coronavirus-safety-and-readiness-tips-for-you.html>

- Aubrey, J. S., & Frisby, C. M. (2011). Sexual objectification in music videos: A content analysis comparing gender and genre. *Mass Communication & Society*, 14(4), 475–501. <https://doi.org/10.1080/15205436.2010.513468>
- Bartky, S. L. (1990). *Femininity and domination: Studies in the phenomenology of oppression*. New York, NY: Routledge.
- Calogero, R. M. (2011). Operationalizing self-objectification: Assessment and related methodological issues. In R. M. Calogero, S. Tantleff-Dunn & J. K. Thompson (Eds.), *Self-objectification in women: Causes, consequences, and counteractions* (pp. 23–49). Washington, DC: American Psychological Association. <https://doi.org/10.1037/12304-002>
- Calogero, R. M. (2012). Objectification theory, self-objectification, and body image. In T. F. Cash (Ed.), *Encyclopedia of body image and human appearance* (Vol. 2) (pp. 574–580). San Diego, CA: Academic Press.
- Calogero, R. M., & Tylka, T. L. (2014). Sanctioning resistance to sexual objectification: An integrative system justification perspective. *The Journal of Social Issues*, 70(4), 763–778. <https://doi.org/10.1111/josi.12090>
- Calogero, R. M., Tantleff-Dunn, S., & Thompson, J. K. (2011). *Self-objectification in women: Causes, consequences, and counteractions*. Washington, DC: American Psychological Association.
- Calogero, R. M., Tylka, T. L., & Siegel, J. A. (2019). Physical safety as bedrock and safeguard to positive embodiment. In T. Tylka & N. Piran (Eds.), *Handbook of positive body image and embodiment* (pp. 139–148). New York: Oxford University Press.
- Calogero, R. M., Tylka, T. L., Siegel, J. A., & Pina, A. (2020). Smile pretty and watch your back: Personal safety anxiety and vigilance in objectification theory. *Journal of Personality and Social Psychology*. <https://doi.org/10.1037/pspi0000344>. Advance online publication
- Centers for Disease Control and Prevention. (2020, April). *Coronavirus disease 2019 (COVID-19)* Retrieved from. <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html>
- Choma, B. L., Hodson, G., Sumnamny, D., Hanoch, Y., & Gummerum, M. (2021). Ideological and psychological predictors of COVID-19-related collective action, opinions, and health compliance across three nations. *Journal of Social and Political Psychology*.
- Choma, B. L., Visser, B. A., Pozzebon, J. A., Bogaert, A. F., Busseri, M. A., & Sadava, S. W. (2010). Self-objectification, self-esteem, and gender: Testing a moderated mediation model. *Sex Roles*, 63(9–10), 645–656. <https://doi.org/10.1007/s11199-010-9829-8>
- Clark, C., Davila, A., Regis, M., & Kraus, S. (2020). Predictors of COVID-19 voluntary compliance behaviors: An international investigation. *Global Transitions*, 2, 76–82. <https://doi.org/10.1016/j.glt.2020.06.003>
- Cohen, S., Janicki-Deverts, D., Doyle, W. J., Miller, G. E., Frank, E., Rabin, B. S., & Turner, R. B. (2012). Chronic stress, glucocorticoid receptor resistance, inflammation, and disease risk. *Proceedings of the National Academy of Sciences*, 109(16), 5995–5999. <https://doi.org/10.1073/pnas.1118355109>
- Daniel, S., & Bridges, S. K. (2010). The drive for muscularity in men: Media influences and objectification theory. *Body Image*, 7(1), 32–38. <https://doi.org/10.1016/j.bodyim.2009.08.003>
- Fairchild, K., & Rudman, L. (2008). Everyday stranger harassment and women's objectification. *Social Justice Research*, 21(3), 338–357. <https://doi.org/10.1007/s11211-008-0073-0>
- Fredrickson, B. L., & Roberts, T. A. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, 21(2), 173–206. <https://doi.org/10.1111/j.1471-6402.1997.tb00108.x>
- Gill, R. (2009). Beyond the sexualization of culture thesis: An intersectional analysis of sixpacks, midriffs, and hot lesbians in advertising. *Sexualities*, 12, 138–160. <https://doi.org/10.1177/1363460708100916>
- Greenfieldboyce, N. (2020). *The new coronavirus appears to take a greater toll on men than on women*. NPR. <https://www.npr.org/sections/goatsandsoda/2020/04/10/831883664/the-new-coronavirus-appears-to-take-a-greater-toll-on-men-than-on-women>
- Griffith, D. M., Sharma, G., Holliday, C. S., Nyia, O. K., Valliere, M., Semlow, A. R., & Blumenthal, R. S. (2020). Men and COVID-19: A biopsychosocial approach to understanding sex differences in mortality and recommendations for practice and policy interventions. *Preventing Chronic Disease*, 17, E63. <https://doi.org/10.5888/pcd17.200247>
- Guan, W. J., Ni, Z. Y., Hu, Y., Liang, W. H., Ou, C. Q., He, J. X., & Du, B. (2020). Clinical characteristics of coronavirus disease 2019 in China. *The New England Journal of Medicine*, 382(18), 1708–1720. <https://doi.org/10.1056/NEJMoa2002032>
- Haffajee, R. L., & Mello, M. M. (2020). Thinking globally, acting locally—The US response to COVID-19. *The New England Journal of Medicine*, 382(22), e75. <https://doi.org/10.1056/NEJMp2006740>
- Harsey, S. J., & Zurbriggen, E. L. (2020). Men and women's self-objectification, objectification or women, and sexist beliefs. *Self and Identity: the Journal of the International Society for Self and Identity*. <https://doi.org/10.1080/15298868.2020.1784263>
- Hart, T., Flora, D., Paloy, S., Fresco, D., Holle, C., & Heimberg, R. (2008). Development and examination of the social appearance anxiety scale. *Assessment*, 15(1), 48–59. <https://doi.org/10.1177/1073191107306673>
- Hebl, M. R., King, E. B., & Lin, J. (2004). The swimsuit becomes us all: Ethnicity, gender, and vulnerability to self-objectification. *Personality & Social Psychology Bulletin*, 30(10), 1322–1331. <https://doi.org/10.1177/0146167204264052>
- Huebner, D. M., & Fredrickson, B. L. (1999). Gender differences in memory perspectives. Evidence for Self-Objectification in Women. *Sex Roles*, 41, 459–467.
- Jones, B. (2020). *Younger Americans view coronavirus outbreak more as a major threat to finances than health*. Pew Research Center. <https://www.pewresearch.org/fact-tank/2020/04/07/younger-americans-view-coronavirus-outbreak-more-as-a-major-threat-to-finances-than-health/>
- Kahn, C. (2020, March 27). *U.S. Men less likely to heed health warnings as coronavirus death toll mounts*. Reuters poll. Reuters. Retrieved from https://mobile.reuters.com/article/amp/idUSKBN21E1C9?_twitter_impression=true&fbclid=IwAR1brMMKnr4T6jKafAuFkuYEDjebEm9h8MREy7T2kWZEDmZmXQZDkwWqA.
- Kilbourne, J. (2002). *Killing us softly 3: Advertising's image of women [documentary]*. Northampton, MA: Media Education Foundation.
- Li, Q., Guan, X., Wu, P., Wang, X., Zhou, L., Tong, Y., & Feng, Z. (2020). Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *The New England Journal of Medicine*, 382, 1199–1207. <https://doi.org/10.1056/NEJMoa2001316>
- Lindner, D., & Tantleff-Dunn, S. (2017). The development and psychometric evaluation of the Self-Objectification Beliefs and Behaviors Scale. *Psychology of Women Quarterly*, 41(2), 254–272. <https://doi.org/10.1177/0361684317692109>
- McKinley, N. M. (2006). Longitudinal gender differences in objectified body consciousness and weight-related attitudes and behaviors: Cultural and developmental contexts in the transition from college. *Sex Roles*, 54(3–4), 159–173. <https://doi.org/10.1007/s11199-006-9335-1>
- Moradi, B., Dirks, D., & Matteson, A. V. (2005). Roles of sexual objectification experiences and internalization of standards of beauty in eating disorder symptomatology: A test and extension of objectification theory. *Journal of Counseling Psychology*, 52, 420–428. <https://doi.org/10.1037/0022-0167.52.3.420>
- Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide* (eighth edition). Los Angeles, CA: Muthén & Muthén.
- Ngonghala, C. N., Iboi, E. A., & Gumel, A. B. (2020). Could masks curtail the post-lockdown resurgence of COVID-19 in the US? *Mathematical Biosciences*, 329, Article 108452 <https://doi.org/10.1016/j.mbs.2020.108452>
- Nivette, A., Ribeaud, D., Murray, A. L., Steinhoff, A., Bechtiger, L., Hepp, U., & Eisner, M. (2020, May 2). *Non-compliance with COVID-19-related public health measures among young adults: Insights from a longitudinal cohort study*. <https://doi.org/10.31235/osf.io/8edbj>
- Oehlhof, M. E. W., Musher-Eizenman, D. R., Neufeld, J. M., & Hauser, J. C. (2009). Self-objectification and ideal body shape for men and women. *Body Image*, 6, 308–310. <https://doi.org/10.1016/j.bodyim.2009.05.002>
- Prusaczyk, E., & Hodson, G. (2020). *Correlates of pornography consumption among men and women* Unpublished raw data.
- Prusaczyk, E., Earle, M., & Hodson, G. (2020). A brief nudge or education intervention delivered online can increase willingness to order a beef-mushroom burger. *Food Quality and Preference*, 87, Article 104045 <https://doi.org/10.1016/j.foodqual.2020.104045>
- Roberts, T. A., & Gettman, J. Y. (2004). Mere exposure: Gender differences in the negative effects of priming a state of self-objectification. *Sex Roles*, 51, 17–27. <https://doi.org/10.1023/B:SERS.0000032306.20462.22>
- Roberts, T. A., Calogero, R. M., & Gervais, S. (2018). Objectification theory: Continuing contributions to feminist psychology. In C. Travis & J. White (Eds.), *APA handbook of the psychology of women* (vol. 1: History, theory, and battlegrounds, pp. 249–272). Washington, DC: American Psychological Association.
- Slater, A., & Tiggemann, M. (2011). Gender differences in adolescent sport participation, teasing, self-objectification and body image concerns. *Journal of Adolescence*, 34(3), 455–463. <https://doi.org/10.1016/j.adolescence.2010.06.007>
- Smith, S. G., Zhang, X., Basile, K. C., Merrick, M. T., Wang, J., Kresnow, M., & Chen, J. (2018). *The national intimate partner and sexual violence survey (NISVS): 2015 data brief – Updated release*. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.
- Stankiewicz, J. M., & Rosselli, F. (2008). Women as sex objects and victims in print advertisements. *Sex Roles*, 58, 579–589. <https://doi.org/10.1007/s11199-007-9359-1>
- Statistics. (n.d.). Retrieved November 30, 2020, from <https://www.rainn.org/statistics>.
- Van Rooij, B., de Bruijn, A. L., Reinders Folmer, C., Kooistra, E., Kuiper, M. E., Brownlee, M., & Fine, A. (2020). Compliance with covid-19 mitigation measures in the United States. <https://doi.org/10.2139/ssrn.3582626>
- Vandello, J. A., & Bosson, J. K. (2013). Hard won and easily lost: A review and synthesis of theory and research on precarious manhood. *Psychology of Men & Masculinity*, 14(2) <https://doi.org/10.1037/a0029826>, 1524–19220
- Wang, Y. A., & Rhemtulla, M. (2021). Power analysis for parameter estimation in structural equation modeling: A discussion and tutorial. *Advances in Methods and Practices in Psychological Science*.
- Who Health Organization. (2020). *Coronavirus – Symptoms* Retrieved from. https://www.who.int/health-topics/coronavirus#tab=tab_3
- Wolf, N. (1991). *The beauty myth: How images of beauty are used against women*. New York, NY: Anchor Book.
- World Health Organization. (2020a). *February. Coronavirus disease 2019 (COVID-19): Situation report - 36* Retrieved from. https://www.who.int/docs/default-source/coronavirus/situation-reports/20200225-sitrep-36-covid-19.pdf?sfvrsn=2791b4e0_2
- World Health Organization. (2020b). *April. WHO timeline – COVID-19* Retrieved from. <https://www.who.int/news-room/detail/27-04-2020-who-timeline-covid-19>

World Health Organization. (2020c). May). *WHO coronavirus disease (COVID-19) dashboard* Retrieved from. <https://covid19.who.int/>

World Health Organization. (2020e). April). *Coronavirus disease (COVID-19) advice for the public* Retrieved from. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>

World Health Organization. (2020f). May). *Global & United States of America* Retrieved from. <https://covid19.who.int/region/amro/country/us>

Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., & Tan, W. (2020). A novel coronavirus from patients with pneumonia in China, 2019. *The New England Journal of Medicine*, 382, 727–733. <https://doi.org/10.1056/NEJMoa2001017>